1734-3 MEASUREMENT AND PAYMENT

Remove Existing Communications Cable will be measured in horizontal linear feet of existing communications cable removed and accepted. Payment will be in linear feet. Sag, vertical segments or spare segments of communications cable will not be paid as these distances will be incidental to the removal of existing communications cable.

No additional measurement will be made for multiple cables being removed from the same conduit or same pole. Where multiple adjacent conduits exist (each containing multiple cables), each conduit will be measured and paid separately. No payment will be made for cable that cannot be removed and is abandoned in place.

No measurement will be made of the removal of messenger cable, pole attachment hardware and junction boxes, as these will be incidental to removing existing communications hardware.

Payment will be made under:

Pay Item	Pay Unit
Remove Existing Communications Cable	Linear Foot

SECTION 1735
CABLE TRANSFERS

1735-1 DESCRIPTION

Remove and reinstall existing communications cable for pole relocations.

1735-2 CONSTRUCTION METHODS

During project, transfers of existing communications cable to new poles may be required. Perform transfers as directed by the Engineer. Remove existing cables from pole to be removed and reinstall these cables and any existing attachment hardware on new pole. Remove all communications hardware from existing pole. Furnish and install any new attachment hardware as required.

1735-3 MEASUREMENT AND PAYMENT

Cable Transfer will be measured and paid as the actual number of cable transfers with attachment hardware to new poles furnished, installed and accepted.

Payment will be made under:

Pay Item	Pay Unit
Cable Transfer	Each

SECTION 1736
SPREAD SPECTRUM RADIO

1736-1 DESCRIPTION

Furnish and install a spread spectrum radio system with all necessary hardware and signage in accordance with the plans and specifications to provide a data link between field devices (i.e. traffic signal controllers, dynamic message signs, etc.). Provide a radio system with a bi-directional, full duplex communications channel between 2 “line-of-sight” antennas using license free, spread spectrum technology operating in the 902-928 MHz frequency band.

Furnish material and workmanship conforming to the NEC, the NESC, UL or a third-party listing agency accredited by the North Carolina Department of Insurance and all local safety laws. Comply with all regulations and codes imposed by the owner of affected utility poles.

1736-2 MATERIAL

Refer to Division 10.

Item	Section
Pole Line Hardware	1098-6
Retroreflective Sheeting	1092-2
Signs and Hardware	1092-1
Spread Spectrum Radio	1098-18
Wire	1091-2

1736-3 CONSTRUCTION METHODS

(A) General

Perform a radio path Site Survey test before installing any equipment. Ensure the test evaluates the signal strength (dBm), fade margin (dB), signal-to-noise ratio, data integrity (poll test) and a complete frequency spectrum scan. Ensure the radio path site survey test is performed using the supplied brand of radio equipment to be deployed. During the initial radio path signal strength test it may be determined that a repeater station may be necessary to complete the intended link. Provide the test results to the Engineer for review and approval. Submit copies of the test results and colored copies of the frequency spectrum scan along with an electronic copy of this information. The Engineer will approve final locations of antennas and any necessary repeater stations. Install a coaxial cable, power divider, antenna splitter cable and additional antenna at locations where it is determined that a dual antenna configuration is necessary to accommodate communications in multiple directions.

Install the antenna in such a manner that avoids conflicts with other utilities (separation distances in accordance with the guidelines of the NESC) and as specified in the antenna manufacturer's recommendations. Secure the antenna mounting hardware to the pole and route the coaxial cable such that no strain is placed on the N-Type male coaxial connectors. On wood pole installations, bond the antenna mounting hardware to the pole ground using #6 AWG bare copper wire using split bolt or compression type fitting.

Install the coaxial cable shield grounding system by carefully removing the outer jacket of the coaxial cable without damaging the cable shield. Install the shield grounding system following the cable manufacturer's recommendations. Install and weatherproof the connection using the appropriate weatherproofing materials and following the manufacturer's recommendations. On wood poles, secure the #6 AWG grounding lead cable to the pole ground using split bolt or compression type fitting or a method approved by the Engineer. On metal poles, secure the #6 AWG grounding lead cable to the pole using a method approved by the Engineer.

Do not exceed the one inch bend radius of the coaxial cable as it traverses from the cabinet to the antenna assembly. Connect the lightning arrestor to the coaxial cable in the equipment cabinet. Properly ground and secure the arrestor in the cabinet. Permanently label all cables entering the cabinet. Ensure the power supply for the radio system is not connected to the GFCI receptacle circuit located in the cabinet. Place a copy of all manufacturer equipment specifications and instruction and maintenance manuals in the equipment cabinet.

At certain locations it may be necessary to integrate the radio system with a fiber optic system. Follow the details shown in the fiber optic splice plans.

(B) Disconnect Switch

At all locations, where the antenna is mounted on a joint use pole, install a double pole, snap switch to remove power from the spread spectrum radio system. Do not mount weatherproof box on the traffic signal cabinet door. Drill a hole in the side of the traffic signal cabinet. Mount the outlet box over the hole using a half inch chase nipple and bushings. Ensure sealing gaskets are in place and no water can enter the cabinet. Securely mount the weatherproof outlet box with additional mounting screws. Bond the outlet box to the equipment ground bus. See plans for approximate mounting height. Run the power supply cord of the spread spectrum radio unit into the outlet box and connect to switch. Securely attach power supply cord to equipment rack. Install disconnect switch with lockout tag cover. If the antenna is mounted on a joint use pole, the "disconnect switch" is required.

Do not install power supply for the radio in a GFCI protected outlet.

(C) Warning Sign(s) and Decal(s)

At all locations, where the antenna is mounted on a joint use pole, secure a warning sign to pole. Mount warning sign(s) at locations called for in the plans. Ensure there are no conflicts between the warning sign and surrounding utilities. Mount warning sign to be easily viewed. Do not mount warning sign under pole grounds or conduit. If the antenna is mounted on a joint use pole, the RF warning sign is required.

Clean and remove any dirt or oil on traffic cabinet before placing decal. Place decal adjacent to the disconnect switch located on the outside of traffic cabinet. If the antenna is mounted on a joint use pole, the decal is required.

1736-4 MEASUREMENT AND PAYMENT

900MHz Radio will be measured and paid as the actual number of 900 MHz radios furnished, installed and accepted. This item includes the appropriate sized antenna(s), radio, power supplies, disconnect/snap switch, signs, decals, data interface cable/serial cable, coaxial cable, lightning arrestor, radio frequency signal jumper, coaxial cable power divider (splitter), coaxial cable connectors, coaxial cable shield grounding system with weatherproofing, labeling and any integration between the radio system and a fiber optic network if necessary, installation materials and configuration software necessary to complete this work, including the radio path Site Survey test and warranties.

Payment will be made under:

Pay Item	Pay Unit
900MHz Radio	Each

SECTION 1743
PEDESTALS

1743-1 DESCRIPTION

Furnish and install the size and type of support assembly for vehicular or pedestrian signal heads, pedestrian pushbuttons, Intelligent Transportation System technologies or other traffic control devices as shown in the plans. Furnish assembly with foundation, grounding system and all necessary hardware as shown in the *Roadway Standard Drawings*. Provide a pedestal assembly that meets *AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals* in effect on the date of project advertisement. Unless otherwise required by the plans, install signal pedestals and pedestrian pushbutton posts on FHWA-approved breakaway support or anchor systems.